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REMARKS

In the office action mailed Mar. 27, 2008, the examiner rejects all non-withdrawn claims as anticipated by U.S. Patent No. 7,042,801 to Berg. The applicants respectfully disagree with this assessment, and offer the following arguments.

Claim 1

Berg describes a method for geophysical prospecting exploiting the *electrokinetic* effect. (Title of the Berg patent) The induced electrokinetic ("IEK") effect means the phenomenon by which seismic (acoustic) energy is converted in rock to electromagnetic energy. (Berg, col. 1, lines 25-30) This effect is sometimes called the *seismoelectric* effect, and was discussed using that name by the applicants in our response mailed Feb. 11, 2008 to the Office Action mailed Jan. 9, 2008. As pointed out there, seismoelectric methods are not about "conversions of electromagnetic to seismic energy in an electroseismic survey" (Present application, claim 1, preamble) because electroseismic is the reverse process from seismoelectric. Electroscismic means electromagnetic energy in, seismic energy out. Since Berg does not at any point address or even recognize the technical problem of the present application, Berg cannot anticipate the applicants' method. While changes have been made recently to how obviousness analysis may be conducted, the applicants believe the foregoing statement is true without exception for novelty analysis. However, further arguments will be presented.

Berg is only tangentially about "reducing noise" (present application, claim 1 preamble), and any noise reduction techniques he does mention are not aimed at noise caused by "near-surface conversions of electromagnetic to seismic energy" (claim 1, preamble), because he never mentions this phenomenon, whether near surface or deep or in between. The examiner believes that Berg does disclose this claim 1 preamble feature in the last line of column 13. First, that passage is a reference to another publication ("Garambois"). Second, the Garambois et al. article is, like Berg, about seismoelectric (IEK) conversions, not about electroseismic conversion. (Garambois: title) Third, Garambois states that "the main difficulty" as regards noise is pickup of

50 cycle hum from power lines. (See page 1418, second column, last paragraph of the *Introduction*.)

Next, the applicants direct attention to their claim 1 feature:

positioning one item of conducting material or a plurality of such items connected by electrical conductor to each other to substantially minimize near-surface electric fields in a region between or defined by the item or items of conducting material, wherein in the case of a single item of conducting material the item is configured to define a region, thereby providing an area of low surface noise for survey receiver placement.

Discussing this clause piece by piece:

positioning one item of conducting material: The examiner cites Berg's Fig. 4, ref. number 12 for this feature. Presumably the number that is meant is 412. From looking at Fig. 4, it seems clear that 412 is meant to refer to the ground, or earth, and that Berg means 408 when he describes "the center conductor of the sparker gun 407" (col. 7, lines 61-62). This attempt to fit Berg to the language of claim 1 will not do because per claim 1 a single item of conducting material must be "configured to define a region, thereby providing an area of low surface noise for survey receiver placement." For example, it can be bent into a circle or closed polygon as shown in the applicants' Fig. 5. Instead, Berg's center conductor 408 is shown as a straight wire or electrode. Berg's 408 therefore cannot define a region in which his survey receivers 303 can be placed.

or a plurality of such items connected by electrical conductor to each other: The examiner contends that such an electrical connection is made via Berg's wires (or cables) 410 and 411, which serves to connect his seismic transmitter power supply to the sensors measuring the induced electromagnetic signals and so to synchronize source and detection networks. (Berg col. 8, lines 8-15) None of the items shown connected by cables 410 or 411 can reasonably be considered items of conducting material.

to substantially minimize near-surface electric fields: The examiner cite col. 14 line 3 here. This cite again is the brief discussion of the Garambois paper. As stated above, the only discussion of near-surface electric fields that the applicants could find in Garambois is the 50 cycle hum pickup problem, which Garambois proposes to deal with not by deploying hardware to physically create a zero-field area by the "Faraday cage" effect of physics as is taught by the present application, but rather by a data processing technique called sinusoid subtraction.

in a region between or defined by the item or items of conducting material: The examiner believes this is shown in Berg at col. 13, lines 55-60 and col. 14 lines 3-5. The col. 13 cite is a mention of a paper by Thompson and Gist, where Berg seems to be saying that Thompson's attempt to use the seismoelectric (not electroseismic it must be pointed out again) phenomenon for hydrocarbon prospecting was successful only for shallow depths. The col. 14 cite is once again the brief discussion of the Garambois article. The applicants cannot make any connection of either cite to the particular claim 1 feature, and request that the examiner explain more particularly where this feature is to be found if the rejection is to be maintained. It is noted that the mention of a certain depth zone in connection with Thompson et al. has nothing to do with the *region* of low electric field which the applicants' invention creates so that receivers may be placed there. It is clear from the context that this claim 1 *region* is a surface or near-surface *area* (not depth slice) because survey receivers are to be placed on it. This is reinforced by every one of the ten drawings in the present application.

wherein in the case of a single item of conducting material the item is configured to define a region: This feature is not addressed in the office action although its importance has been noted above in the discussion of the feature *positioning one item of conducting material*.

thereby providing an area of low surface noise for survey receiver placement: The examiner cites col. 14 lines 1-5, the brief discussion of the Garambois article again, and quotes the words "near surface material electric and magnetic properties may tend to mask or hide valid IEK electromagnetic signals generated at greater depth if not properly accounted for." These words merely identify a problem

that can arise in seismoelectric prospecting (not addressing electroseismic prospecting), and do not remotely suggest a solution as defined in the applicants' claim 1 that creates an area of low electric field in which survey receivers are advantageously placed. Moreover, it is not "near surface material electrical and magnetic properties" that create the problem addressed by claim 1. It is instead the high electric field created by the electroseismic source (as opposed to a seismoelectric source which puts out a seismic signal), particularly strong near the surface because that is close to the source, stimulating only those material properties that contribute to the electroseismic conversion phenomenon, which are not generally any more pronounced near the surface than deeper.

For the above reasons, the applicants believe that the rejection of claim 1 must be withdrawn.

Other claims

In claims 8 and 18, there must be at least two or more near electrodes connected by electrical conductor to a first output terminal of the electroseismic source signal generator, and at least one "far" electrode connected by electrical conductor to a second output terminal of the electroseismic source signal generator. The question is whether Berg shows such an electrode configuration. The examiner believes that Berg does show this in the drawing features A and B shown in his drawings such as Figs. 3 and 4. The applicants respectfully disagree. A and B are ground rods (col. 7, line 56) that serve as current return to the AC power source 401 (col. 7, line 58). While not clear in Berg, it may be that A and B serve a dual role, constituting a dipole source that applies the "electromagnetic sounding signal," see col. 2, line 31. Nevertheless, if A and B are to be deemed the two near electrodes of the applicants' claims 8 and 18 as suggested by the examiner, then where is the at least one far electrode? This cannot be A serving in a dual capacity because the claim requires near and far electrodes to be connected to opposite polarity terminals of the signal generator. Furthermore, as noted by the examiner, item 104 in Berg's Fig. 1 is indeed a receiver, but it is an electromagnetic receiver (col. 4, lines 38-40), not the seismic (acoustic) receiver used in electroseismic surveys. Thus, Berg's 104 could

not be a "receiver" of the applicants' claim 1, and even if it were, it is not shown to be located "central to the near electrodes" which have no counterpart in Berg's Fig. 1.

Regarding claim 9, the applicant believes that Berg's Fig. 4 shows A and B, which are ground rods driven into the ground, as being vertical, not horizontal as claim 9 requires for all electrodes in that particular embodiment.

Entry of claim amendments

The applicants are concerned that the claim amendments made with the request for continued examination may not have actually been entered despite the statement in the last office action that "Applicant's submission filed on 2/29/08 has been entered." The claim amendments in question were first submitted in the applicants' Response to Final Examination transmitted on Feb. 11, 2008, but the examiner informed the applicants (by telephone call on Feb. 22, 2008) that the amendments would not be entered at that time because they would necessitate a new search. Therefore, the applicants filed for continued examination on Feb. 29, 2008 requesting entry of those amendments and examination of the amended claims. However, the applicants note in the current office action (mailed 3/27/08), that quotes from claim 1 are from the version of claim 1 before said amendments. For example, claim 1 is quoted as requiring "plurality of such items electrically connected to each other," when after the amendments, that passage reads "plurality of such items connected by electrical conductor to each other." Entry of those amendments is requested again.

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CONCLUSION

The applicants believe that the preceding arguments demonstrate that claim 1 is novel over Berg. Claims 8, 9 and 18 depend from claim 1 and are therefore also patentable for that reason as well as for independent reasons identified above. The applicants believe the same applies to claim 14, which depends from claim 8 and was never withdrawn. As stated in the applicants' response of Oct. 19, 2007, the applicants further request that withdrawn claims 10-13, 15-17 and 25 be reinstated and allowed also since a generic claim (claim 1) has been shown to be allowable.


The Commissioner is authorized to charge any additional fees which may be required, to Account No. 05-1328.

Respectfully submitted,

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